

Claims

1. A method for producing an optical component of quartz glass by elongating a coaxial arrangement of a core rod and a hollow cylinder of a predetermined length in that the arrangement is supplied in vertical orientation to a heating zone and is softened therein zonewise, starting with its lower end, and the component is drawn off downwards from the softened region, the hollow cylinder having an inner bore which in the region of its lower end is provided with a constriction on which the core rod is supported, characterized in that the inner bore (5) is mechanically machined to a final dimension, and that the constriction of the inner bore (5) is produced in that the lower front end of the hollow cylinder is softened, upset against a tool (2, 17, 22) and thus folded inwards with formation of a peripheral bead ring (6, 16).
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2. The method according to claim 1, characterized in that the tool (2, 17) has a shaped part (4, 18) projecting into the inner bore (15), the inwardly folded quartz glass coming to rest on the shaped part (4, 18) with formation of the peripheral bead ring (6, 16).
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3. The method according to claim 1 or 2, characterized in that the hollow cylinder (1) and the tool (2, 17, 22) are heated up in a furnace (9) to a temperature at which quartz glass softens.
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4. The method according to any one of the preceding claims, characterized in that a tool (17) is used in the case of which the shaped part (18) comprises a conical surface (18) projecting into the inner bore (15) of the hollow cylinder (11).
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5. The method according to any one of the preceding claims, characterized in that a tool (2) is used in which the shaped part is formed as a peg (4) projecting into the inner bore (5) of the hollow cylinder (1), which has an outer diameter corresponding to the inner diameter (5) of the developing bead ring (6).
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6. The method according to claim 5, characterized in that the tool (2) comprises an annular groove (3) having an outer diameter corresponding to the outer diameter of the hollow cylinder (1), and an inner diameter corresponding to the inner diameter of the bead ring (6).
- 5 7. The method according to any one of the preceding claims, characterized in that the tool (2, 17) consists of graphite or a carbon fiber-reinforced carbon.
8. The method according to any one of the preceding claims, characterized in that the tool (2, 17) and the softened front end of the hollow cylinder (1, 11) are rotating opposite to each other about the longitudinal axis (10) of the
- 10 hollow cylinder.
9. The method according to any one of the preceding claims, characterized in that an outer cone (7) is formed on the softened front end of the hollow cylinder (1) by means of the tool (2).
10. The method according to any one of the preceding claims, characterized in that a tool is used in the form of a quartz glass tube (22) which is fused with the front end of the hollow cylinder (21) in the form of a joint.
- 15 11. A method for producing an optical component of quartz glass by elongating a coaxial arrangement of a core rod and a hollow cylinder of a predetermined length in that the arrangement is supplied in vertical orientation to a heating zone and is softened therein zonewise, starting with its lower end, and the component is drawn off downwards from the softened region, the hollow cylinder having an inner bore which in the region of its lower end is provided with a constriction on which the core rod is supported, characterized in that the inner bore (55) is mechanically machined to a final dimension, and that the constriction of the inner bore (55) is produced in that during mechanical machining in the region of the lower end a collar (52) is produced which extends about the longitudinal axis (10) of the inner bore (55) and projects inwards.
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12. The method according to claim 11, characterized in that the surrounding collar (52) is produced with a maximum height which is 0.5 to 0.32 times the inner diameter of the inner bore (55), preferably 0.1 to 0.2 times the inner diameter of the inner bore (55).
- 5 13. The method according to claim 11 or 12, characterized in that the surrounding collar (52) is produced with an extension, viewed in the direction of the longitudinal axis (10), which is in the range between 15 mm and 40 mm, preferably below 30 mm.
- 10 14. The method according to any one of claims 11 to 13, characterized in that a collar (52) is produced with an inner cone tapering towards the lower end.
- 15 15. The method according to any one of claims 11 to 14, characterized in that a hollow cylinder is used whose inner bore (55) has a stepped constriction in the region of its lower end prior to mechanical machining to a final dimension.
16. A method for producing an optical component of quartz glass by elongating a coaxial arrangement of a core rod and a hollow cylinder of a predetermined length in that the arrangement is supplied in vertical orientation to a heating zone and is softened therein zonewise, starting with its lower end, and the component is drawn off downwards from the softened region, the hollow cylinder having an inner bore which in the region of its lower end is provided with a constriction on which the core rod is supported, characterized in that a raw cylinder (33, 43) is provided which is longer than the hollow cylinder (31, 41) to be elongated, and whose bore (35, 45) is mechanically machined to a final dimension, and that the raw cylinder bore (35, 45) is heated in a collapsing zone (34, 48) spaced apart from the front end of the raw cylinder (33, 43) at a distance corresponding at least to the length of the hollow cylinder (31, 41), and is thereby collapsed in part, and that the hollow cylinder (33, 43) is subsequently separated in the region of the collapsing zone (34, 48).

17. The method according to claim 16, characterized in that the raw cylinder (33, 43) consists of at least two start cylinders (31, 41) connected to each other at the front side and joined in the region of an attachment zone in the form of a joint, and that heating and partial collapsing of the raw cylinder (33, 43) are carried out in the area of the attachment zone.

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18. The method according to claim 17, characterized in that at least one of the start cylinders (31) has a reduced wall thickness (32) in the region of the attachment zone.

19. The method according to claim 18, characterized in that the region of
10 reduced wall thickness (32) is configured as a conical taper.

20. The method according to claim 16 or 17, characterized in that the raw cylinder (43) is softened in vertical orientation, suspended in an annular heating element (49), in the region of its collapsing zone (48) and is elongated in this process under the action of its own weight.

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21. The method according to claim 16, characterized in that the raw cylinder has a cylindrical outer jacket which prior to heating and collapsing in the region of the collapsing zone (32, 48) is provided with a radially surrounding notch.

22. The method according to any one of claims 16 to 21, characterized in that a negative pressure as compared with the pressure externally applied to the
20 cylindrical outer surface is produced in the bore during collapsing.

23. A hollow cylinder of quartz glass for carrying out the method according to any one of claims 11 to 15, comprising an inner bore which in the region of one of its ends is provided with a constriction, characterized in that the inner bore (55) has a surface which is mechanically machined to a final dimension, and that the constriction is formed as a collar (52) which is produced during mechanical machining and projects into the inner bore (55).

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24. The hollow cylinder according to claim 23, characterized in that the surrounding collar (52) has a maximum height which is 0.05 to 0.32 times the inner diameter of the inner bore (53), preferably 0.1 to 0.2 times the inner diameter of the inner bore (55).

5 25. The hollow cylinder according to claim 23 or 24, characterized in that the surrounding collar (52) has an extension, viewed in the direction of the longitudinal axis, which is within the range between 15 mm and 40 mm, preferably below 30 mm.

10 26. The hollow cylinder according to any one of claims 23 to 25, characterized in that the end of the hollow cylinder which is provided with the constriction is formed as an outer cone.

27. The hollow cylinder according to any one of claims 23 to 26, characterized in that the collar (52) has an inner cone tapering towards the end of the inner bore (55).